

## REMARKS

Claims 1-11 were pending in the present application. By virtue of this response, claims 1-11 have been amended without prejudice or disclaimer of any previously claimed subject matter, and new claims 12-15 have been added. Accordingly, claims 1-15 are currently under consideration. Amendment of certain claims is not to be construed as a dedication to the public of any of the subject matter of the claims as previously presented. Support for new claim 12 is found in the present application, for example, on page 14, lines 8-10, page 18, lines 15-17, page 21, lines 20-25, page 26, lines 19-22, page 30, lines 10-14, and page 33, lines 19-23. Support for new claim 13 is present in the present application on pages 20 to 29. Support for claim 14 is found in the present application on page 24, lines 12-24. Support for claim 15 is found in the present application on page 26, line 17 to page 27, line 9.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attachment is entitled **“VERSION WITH MARKINGS TO SHOW CHANGES MADE.”**

### Rejections under 35 U.S.C. §102(e)

Claims 1-11 stand rejected under 35 U.S.C. § 102 (e) as being anticipated by *Fujimoto et al.* (U.S. Patent No. 6,242,761).

Claim 1 has been amended to recite, in part, a “gallium nitride compound semiconductor light-emitting diode,” wherein “the n-type transmissive electrode and p-type transmissive electrode are films so as to be substantially transparent.” The amendment clarifies a feature of the claimed invention that offers the advantage that both the p-type electrode and the n-type electrode are substantially transparent with respect to light emitted from the light-emitting device. Accordingly, this feature allows light to pass through the n-type electrode so as to exit the device and improve the external emission efficiency. Such advantages are described in the present application, for example, on page 5, line 16 to page 6, line 5.

*argue* Fujimoto et al. do not disclose or suggest such a gallium nitride compound semiconductor light-emitting diode for at least the following reasons. The n-type electrode of Fujimoto et al. is not a "substantially transparent," n-type transmissive electrode as recited in claim 1. The Examiner contends that Fujimoto et al. discloses the device of claim 1, in part, because the n-type transmissive electrode of Fujimoto et al. is of a type that is "substantially transparent, because of the inherent material properties and structure disclosed." The n-type electrode 130 of Fujimoto et al., however, is formed of a stacked structure of 50 nm-thick Ti and 0.5  $\mu$ m-thick Au. (Fujimoto et al.: col. 6, line 66 to col. 7, line 3). Further, to improve the adhesive strength of the bonding on the electrodes, approximately 5 nm-thick Cr and 1  $\mu$ m-thick Au are stacked to form an electrode pad. *argue* The structure of Fujimoto et al. is not "substantially transparent." The n-type electrode of Fujimoto et al. comprises a stacked structure of metal layer, and while n-type electrode may include similar materials as the n-type electrode of the claimed invention, the structure is completely different. The electrode of Fujimoto et al. is at least 550 nm thick, which is not a film that is transmissive to light, i.e., "substantially transparent," as recited in claim 1.

The combination of structure and material recited in claim 1 leads to the "substantially transparent" nature of the n-type electrode of claim 1 that is not disclosed or suggested by Fujimoto et al. The n-type transmissive electrode and p-type transmissive electrode as recited in claim 1 are films so as to be substantially transparent. This amendment clarifies that the films are substantially transparent, for example, by being on the order of a few nanometers such that they are substantially transparent. Such a feature of claim 1, is neither disclosed nor suggested by Fujimoto et al.

Claims 2-11 depend from claim and should be allowable for at least the same reasons as claim 1. Further, Fujimoto et al. does not disclose a gallium nitride compound semiconductor light-emitting diode "wherein the n-type transmissive electrode is formed on a side face of the substrate..." as recited in claim 5. The n-type electrode 130 in Figure 1 of Fujimoto et al., identified by the Examiner, is clearly only formed on a single layer and does not cover a side

face of the substrate, the buffer layer, or the n-type gallium nitride compound semiconductor layer. Further, the structure recited in claim 5 is not disclosed or suggested in any other figures or description of Fujimoto et al. Accordingly, Applicant request withdrawal of the rejection.

Fujimoto et al. similarly does not disclose or suggest the semiconductor light emitting diodes defined by new claims 12-15. Fujimoto et al. does not disclose or suggest a gallium nitride compound semiconductor light-emitting diode including an n-type transmissive electrode formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type gallium nitride compound semiconductor layer, as recited in new claim 13. Similarly, Fujimoto does not disclose or suggest the features recited in dependent claim 14 and 15.

The Applicant submits that each of the pending claims as amended herein are not disclosed or suggested in Fujimoto et al. Withdrawal of this rejection is therefore respectfully requested.

## CONCLUSION

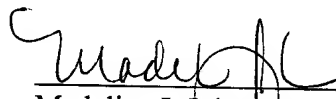
Applicant has, by way of the amendments and remarks presented herein, made a sincere effort to overcome rejections and address all issues that were raised in the outstanding Office Action. Accordingly, reconsideration and allowance of the pending claims are respectfully requested. If it is determined that a telephone conversation would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952**, referencing docket no. 299002051900. However, the Assistant Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: September 9, 2002

By:

  
\_\_\_\_\_  
Madeline I. Johnston  
Registration No. 36,174

Morrison & Foerster LLP  
755 Page Mill Road  
Palo Alto, California 94304-1018  
Telephone: (650) 813-5840  
Facsimile: (650) 494-0792

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-11 have been amended as follows:

1. (Amended) A gallium nitride compound semiconductor light-emitting diode ~~light emission device~~ comprising:
  - a substrate;
  - an n-type electrode region comprising an n-type transmissive electrode;
  - a gallium nitride compound semiconductor multilayer structure including an active layer; and
  - a p-type electrode region comprising a p-type transmissive electrode, wherein the n-type transmissive electrode and p-type transmissive electrode are films so as to be is of a type which is substantially transparent.
2. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1, wherein the p-type transmissive electrode and the n-type transmissive electrode transmit light which is generated in the active layer and reflected from the substrate so that the light exits the light emission device.
3. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1, wherein the n-type transmissive electrode is located outside of the p-type transmissive electrode.
4. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1, wherein the n-type transmissive electrode is formed around a circumference of the p-type transmissive electrode.
5. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1,

wherein the gallium nitride compound semiconductor multilayer structure includes a buffer layer and an n-type gallium nitride compound semiconductor layer, and

wherein the n-type transmissive electrode is formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type gallium nitride compound semiconductor layer in a region neighboring the buffer layer.

6. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1,

wherein the n-type electrode region further comprises an n-type pad electrode, and  
wherein the p-type electrode region further comprises a p-type pad electrode.

7. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 6, wherein the n-type pad electrode and the p-type pad electrode are provided substantially along one side of a light emitting face of the gallium nitride compound semiconductor light emission device.

8. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 6, wherein the p-type pad electrode is formed in the vicinity of a center of a light emitting face of the gallium nitride compound semiconductor light emission device.

9. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 1, wherein the n-type transmissive electrode comprises ~~at least one of a thin metal film and an oxide semiconductor.~~

10. (Amended) A gallium nitride compound light-emitting diode ~~light emission device~~ according to claim 6, wherein the n-type pad electrode is of a type which realizes a Schottky contact.

11. (Amended) A gallium nitride compound semiconductor light-emitting diode ~~light emission device~~ according to claim 6, wherein the n-type pad electrode comprises at least one material selected from the group consisting of:

Pd/Au, Ni/Au, Pt/Au, Pd/Ni/Au, Pd/Al, Ni/Al, Pt/Al, and Pd/Ni/Al, ~~Pd/oxide semiconductor, Ni/oxide semiconductor, Pt/oxide semiconductor, and Pd/Ni/oxide semiconductor;~~

or an alloy comprising one or more material selected from the above group.